Continuous Mortality Investigation

Critical Illness Committee

WORKING PAPER 18

1999-2002 Critical Illness experience:
Feedback on Working Paper 14 and Future Work

CONTENTS

December 2005

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1. INTRODUCTION

1.1. Working Paper 14 ('Methodology underlying the 1999-2002 CMI Critical Illness experience investigation'), published in May 2005, set out the CMI's analysis methodology for its Critical Illness investigation and sought feedback on that methodology.

1.2. Section 2 (and Appendix A) of this paper set out the feedback received and the Committee's response to this feedback. After much deliberation, the Committee has decided that it is inappropriate to graduate this dataset and the rationale for this decision is set out in Section 3. The issue of when it will be suitable to graduate is also considered briefly. Section 4 then describes the further work that the Committee is undertaking on the 1999-2002 dataset. Finally, in Section 5 this paper sets out the Committee's initial thoughts on how it will treat claim delays in the analysis of data for 2003 and subsequent years.

1.3. As with other CMI Working Papers, this paper is written not only to update the profession on progress but to seek the views of the profession on our work. Please email any feedback on this paper to ci@cmib.org.uk.

1.4. In general the feedback received to Working Paper 14 was very positive. The main point that emerged was a desire of practitioners for grossing-up factors that can be applied to subsets of the overall experience. The CI Committee is supportive of this request, but was obviously reluctant to undertake this work before it had exposed its proposed methodology to the profession. It was also aware that this was not a mechanistic process. Work has now commenced on additional grossing-up factors, in particular using more recent data.

1.5. 1999-2002 is the first quadrennium for which the CMI has released results and the Committee had hoped to graduate the data to produce the first table of critical illness experience based on UK insured lives. However after much discussion, the Committee has concluded that it is inappropriate to graduate the 1999-2002 experience. The rationale is covered in Section 3 but in summary is because of the immaturity of the dataset, its limited range and the uncertainties that exist within the dataset due to the need to estimate dates of diagnosis and the application of grossing-up factors. Instead the Committee hopes to estimate and publish appropriate adjustments to CIBT93.

1.6. Section 4 summarises the further work that the Committee intends to undertake on the 1999-2002 dataset. Feedback from the profession on this is welcomed, as the Committee will then try to accommodate suggestions within its work schedule. The Committee intends to publish the results of this further work in its analysis of the 1999-2002 experience in a CMI Report in 2006.

1.7. Whilst work continues on the 1999-2002 dataset, good progress is being made on the collection of data for 2003, with some offices having already received their own final results back. The Committee has agreed to use the delay adjustments inherent in the 1999-2002 data for 2003 results but is considering alternative approaches for subsequent years

1.8. The Committee is keenly aware that the dataset would be more robust and the accuracy of the grossing-up factors more accurate if the date of diagnosis had been provided for more claims and requests that offices make further effort to provide this in future years.

2. FEEDBACK RECEIVED ON WORKING PAPER 14

2.1. The CMI CI Committee would like to express its thanks to the people who took the time to read Working Paper 14 and provide comments - Eli Friedwald, Hamish Galloway, Eugene Hertzman, Caroline Hunter, Adrian Pinington, Stephen Richards, Darshan Singh, Brian Valentine and David Wilkie.

2.2. In general the feedback received to Working Paper 14 was very positive. Appendix A contains a summary of the issues that people raised. The comments are verbatim but anonymous. Against each comment is the Committee's response to the comment.

2.3. The main point that emerged was a desire of practitioners for grossing-up factors that can be applied to subsets of the overall experience. The CI Committee is supportive of this request, but was obviously reluctant to undertake this work before it had exposed its proposed methodology to the profession.

2.4. As noted in the various comments, providing an analysis of the 1999-2002 experience by any risk factor is of limited value within knowing the grossing-up factor that applies to that subset of the data. It is therefore desirable to estimate factors that apply by duration, age, gender, smoker status, cause of claim, distribution channel and by calendar year. Separate factors may also be required for amounts, as well as lives.

2.5. However the credibility of the data is obviously reduced as the data is sub-divided. The calculation of the factors is heavily influenced by the existence of long-delayed claims and as one sub-divides the data, their existence or otherwise in a particular cell could distort identical underlying delay patterns.

2.6. In the methodology the Committee adopted for estimating the overall grossing-up factors, it was necessary to estimate the underlying claim delay pattern. This involved a degree of subjectivity, because the combination of long claim delays and overall growth in business mean that the observed claim delay pattern is under-weight in long-delayed claims. However the growth in expected claims is not known and had to be estimated. These estimates were validated against market data.

2.7. Unfortunately if one seeks to estimate grossing-up factors for subsets of the dataset, market data is not available to inform our estimates. As a result it is not clear whether differences in observed claim delay patterns reflect genuine differences, or merely result from different growth rates in expected claims.

2.8. This issue is illustrated by Figure 1. This shows that when one looks at observed claim delay patterns by duration, claims at duration 5+ appear to exhibit shorter delays. Whilst one can consider the exposure data to see whether the growth in business at longer durations has been faster than average (which would also give rise to the observed effect), this is not a good measure of the growth in expected claims, for a number of reasons:.

- The true impact of selection on experience is unknown;
- There will be a different mix of offices at different durations; and
- Longer duration business can also be expected to have a higher average age, which will tend to increase claim rates.

All these factors mean that the growth in expected claims for a particular subset of the portfolio is unknown and the estimation of grossing-up factors is not a mechanical exercise. We are left unclear whether a difference in observed delays such as that apparent in Figure 1 is the result of a difference in the underlying delay pattern, a difference in growth of expected claims or merely reflects the lack of credibility associated with subsets of the data.

Figure 1: Observed claim delay patterns by duration
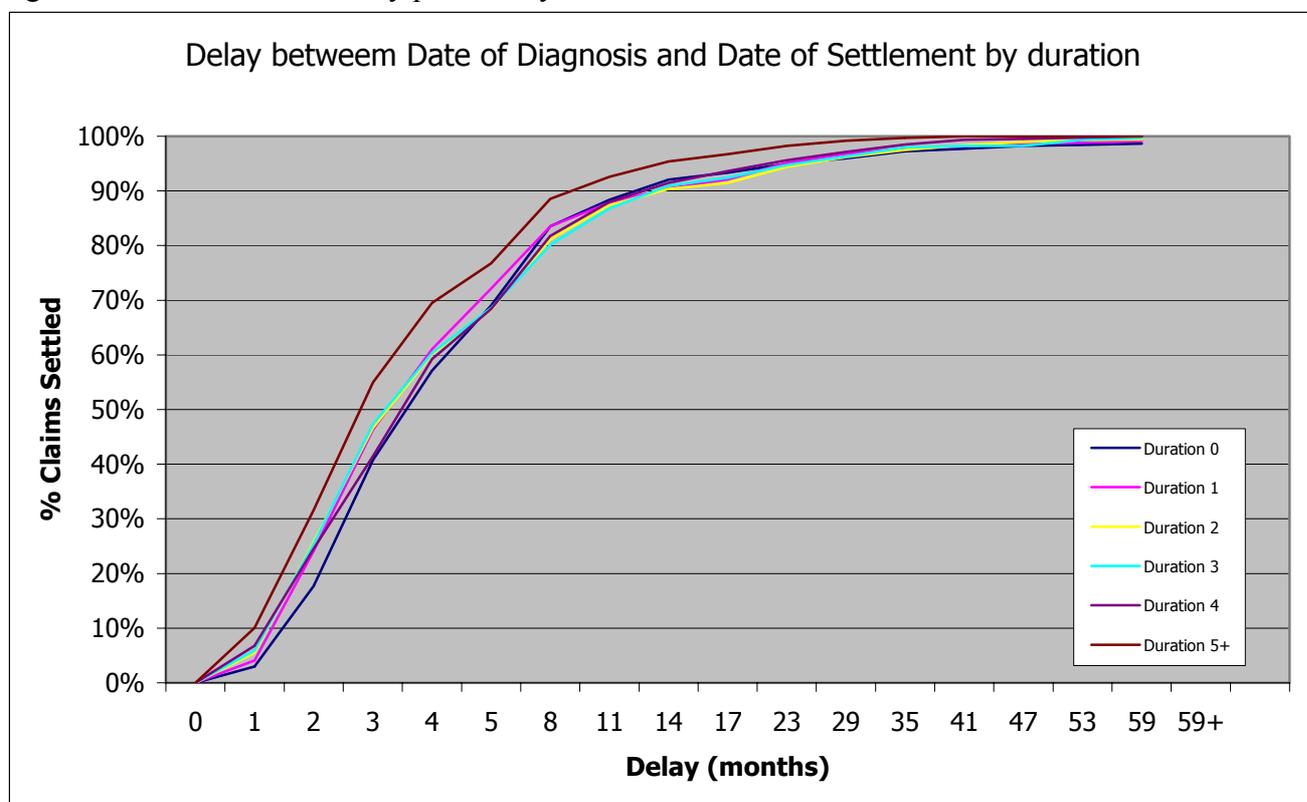
2.9. Given the good progress in collecting 2003 data, the Committee has therefore shifted its emphasis to using the additional information this yields to inform its work on additional grossing-up factors. This work is described further in section 4 and we hope to publish the results in a CMI report on the 1999-2002 experience in 2006.

3.   GRADUATION OF THE 1999-2002 DATA

3.1. 1999-2002 is the first quadrennium for which the CMI has released results. Some data was collected for prior years but volumes were insufficient to warrant detailed analysis.

3.2. The Committee had hoped that it would be able to graduate the data from 1999-2002 to produce the first table of critical illness experience based on UK insured lives. However after much discussion, the Committee has concluded that it is inappropriate to graduate the 1999-2002 experience.

3.3. There is undoubtedly a desire from practitioners for a reliable standard table for Critical Illness and this is one of the aims of the Committee, included in our Terms of Reference. Currently the most widely used table in the UK is CIBT93, which was derived from population data so does not reflect insured lives' experience. It was intended to relate to experience in 1993.

3.4. However the Committee believes it also has a requirement that any table it produces is robust and suited to the needs of the profession. The key issues the Committee considered in deciding whether to graduate the quadrennial data were:
- Is the 1999-2002 dataset sufficiently reliable to underpin a graduation?
- Should grossing-up factors be applied to the data before it is graduated?
- Can grossing-up factors be estimated with sufficient accuracy to ensure the table has the right shape?
- Will the uncertainties underlying the table be understood by practitioners and be used correctly?

These issues are considered in this section of the paper.

3.5. The 1999-2002 CI dataset contains a substantial volume of data. In total, it comprises 7.4 million life-years of exposure and 11,803 claims. However, the dataset is less credible when one starts to sub-divide it:
- 13% of the claims relate to stand-alone business. This dataset is not credible on its own, and any graduation can therefore use only the data for accelerated business.
- The dataset is weighted towards early durations, with only 24% of the claims at durations 5+. This means both that we cannot base the graduation on ultimate data alone but also that the dataset cannot be considered mature or fully developed. In particular, uncertainty remains over the duration and shape of initial selection and so over the level of the ultimate experience.
- The dataset will need to be graduated separately for males and females (and ideally for smokers and non-smokers) which further reduces the quantity of data within each set: 42% of the claims relate to male non-smokers, 18% to male smokers, 32% to female non-smokers and 8% to female smokers.
- The dataset covers a limited age range. Over 80% of the claims fall between ages 30 and 55, and over 95% between ages 25 and 60. Clearly no reliable graduation will be possible outside these ages.

3.6. In practice therefore, any graduation would probably have to be restricted to accelerated business, all durations, ages 30 to 55 only for each of male non-smokers and female non-smokers. Its value to the profession is therefore limited.

3.7. Even within the 'core' central dataset, considerable uncertainties remain. The Committee adopted date of diagnosis as the most appropriate measure of the claim date but, as described in Working Paper 14, claims are currently included within the analysis according to their date of settlement. This is done for a combination of practical reasons, including:

- Not all claims diagnosed within the quadrennium will yet have been settled. Waiting for all the claims to be settled would necessitate considerable delays in releasing results.
- Offices were only able to provide the date of diagnosis (which is used as the 'claim date' for determining age and duration) for 56% of claims.

3.8. As explained in Working Paper 14, grossing-up factors are therefore required to compensate for the fact we are using claims settled during the quadrennium as the actual claims. This means that the raw results understate the true, fully-developed results because of the delays in settling claims and the growth in expected claims. These have been estimated at an overall level to add around 15% to the raw results.

3.9. In addition, and unusually for a CMI dataset, the raw results released to members depend on estimates made by the Committee relating to the missing dates of diagnosis to determine the age and duration at date of claim. The missing dates have been estimated from those claims where both the diagnosis date and another claim date are available. This may introduce errors if there are differences in claim delays between those claims where we know the diagnosis date and those where we do not (e.g. differences between offices). These estimation errors will also affect the grossing-up factors.

3.10. The values of the grossing-up factors depend on the growth in expected claims and the delay pattern of claims. It is likely that both of these will vary within sub-groups of the data hence the grossing-up factors will vary by office and with cause of claim, age, duration, gender and smoker status. This means that it is inappropriate to apply a single grossing-up factor across the entire dataset. However there are considerable difficulties inherent in estimating the grossing-up factors applicable to subsets of the data (see section 2.6) meaning that using our initial method has limited credibility. Furthermore the approach used to estimate the factors is data-hungry and sub-dividing the data will cause calculation issues. It is also possible that undue reliance will be placed on the table given the uncertainty which surrounds the factors.

The desire for segregated grossing-up factors is the main reaction to Working Paper 14, and something therefore that the Committee will seek to address (see Section 2.3).

3.11. Options for Graduation

3.10.1 Against the background described above - of a very limited range of credible data and estimation issues within that data - the Committee discussed various options to graduation that are described and evaluated below.

3.10.2 *Graduate the raw data*. This has the benefit of simplicity and does not risk distorting the experience before it is graduated. However the table will not be at the correct level to reflect the underlying experience and if the grossing-up factors do vary as suggested above then it will not have the correct shape either. The Committee is also concerned that the table may be inappropriately used, i.e. without making the necessary adjustment, leading to under-pricing and under-reserving. Further, such graduation of the data will in any case produce a table with only a very limited range.

3.10.3 *Estimate grossing-up factors that apply by age, duration, etc and apply these to the data before it is graduated*. The Committee is concerned that this approach will bestow greater credibility on the grossing-up factors than their method of estimation actually

warrants. There is a danger that practitioners will use the table without recognising the assumptions and estimation errors implicit within the table. And again, this approach will only produce a table with a very limited range.

3.10.4 *Estimate "appropriate" adjustments to CIBT93.* Rather than publishing a standard table, this approach would involve undertaking the more detailed analysis of grossing-up factors in order to indicate the likely underlying experience by age, duration, etc. However by expressing this as a series of adjustments to CIBT93 for the age range within which the CMI has reasonable data volumes, and by continuing to use CIBT93 as the main comparison basis within CMI results, the work is not afforded undue credibility and the implicit uncertainties may be better recognised by the profession.

As part of this analysis, it may be appropriate to provide an indication of how more recent population data would have affected CIBT93, in order to provide a better understanding of how insured experience compares with the underlying population experience. This may also allow us to comment on likely levels of insured experience at ages above those where we currently have data.

3.10.5 *Release the data to a Working Party which could then produce a table for use by practitioners.* This approach seeks a similar outcome to 3.10.4, in terms of providing the appropriate data to the profession, but stopping short of producing something that is likely to be regarded as a Standard Table. The Committee does not think this is the best approach, as the understanding developed to date of claim delays and associated issues could be lost. Establishing such a working party is also likely to lose time, when practitioners are keen to get finalised results.

3.10.6 *Delay the graduation until the claims experience is 'complete'.* Some of the issues arise from the fact that we are considering the 1999-2002 experience without the benefit of the additional data on claims diagnosed during that period that will become available from offices' submissions for 2003 and later years. For offices that do provide dates of diagnosis on all claims, it should be possible to monitor their underlying 1999-2002 experience provided they continue to submit data, thereby eliminating the need for grossing-up factors. Waiting for this data obviously delays the publication of results.

Even then it is not a complete solution as some offices are unable to provide dates of diagnosis on all claims. This means that we do not know which of the claims settled in, say, 2003 relate to 2003 and which to prior years. However the information from those offices that do provide diagnosis dates would improve our ability to estimate the grossing-up factors for offices who do not submit dates of diagnosis as it would remove one source of uncertainty.

3.10.7 In the light of the above, the Committee decided that 3.10.4 was the preferred option. However it also agreed to seek to monitor the emerging experience as described in 3.10.6. Subsequently better progress has been made with collecting and validating this data than was expected and this has therefore become the focal point of current work.

3.12. When will a graduated table be produced?

3.12.1 The CI Committee remains committed to producing a graduated table of UK insured critical illness experience at the earliest sensible opportunity. There currently appear to be several options open to the Committee in this regard, including:

a)   There is a possibility that the further work on grossing-up factors will reveal these to be more robust than we currently expect. If so, it may be possible to graduate the 1999-2002 data with grossing-up factors incorporated;

b)   Re-visit the 1999-2002 data after data has been analysed for, say, 2003 and 2004, thereby reducing the reliance on grossing-up factors; or

c)   Await a more robust dataset.

3.12.2   Options a) and b) above both overcome some of the issues surrounding the use of grossing-up factors, but still leave the fundamental issue of an immature dataset. This is illustrated by Table 1 which shows the split of claims by duration and year. For simplicity, durations of 5 and over have been grouped but as yet we have not ascertained the true select period underlying critical illness.

Table 1. Number of 1999-2002 claims by duration and calendar year.

	1999	**2000**	**2001**	**2002**	**1999-2002**
0	484	487	575	773	2,319
1	457	517	565	591	2,130
2	404	444	442	532	1,822
3	303	359	388	464	1,514
4	181	276	328	342	1,127
5+	340	596	821	1,134	2,891
All durations	2,169	2,679	3,119	3,836	11,803

3.12.3   Overall in 1999-2002, claims at durations 5 and over represented only 24% of the total dataset, but this figure is increasing at a significant rate – for 1999, it was only 16% and by 2002 had increased to 30%. If data volumes continue to increase – and several major new data contributors are committed to providing data from 2003 onwards – then this may not mean having to wait 4 years before a graduation is undertaken, but could instead be undertaken on, say, the 2002-2005 data, or even the 1999-2005 data.

3.12.4   However the existence of the new data contributors may mean that it is advisable to wait for a full 4 years of data for all the large offices before a graduation is undertaken. This issue cannot be resolved until the data of the new contributors is received and analysed to consider whether it differs significantly from existing contributors. The Committee will monitor this situation closely and will report progress to the profession.

3.12.5   The Committee also intends to seek to re-visit the claims delays on claims diagnosed in 1999-2002 as subsequent years' data is analysed, as described in 3.10.6. This work will help assess the accuracy of the estimates of the grossing-up factors.

3.12.6   Views of the profession on this issue are welcomed.

4.   FURTHER WORK ON THE 1999-2002 DATA

4.1   Results for the 1999-2002 quadrennium have been released to CMI member offices. At the time the All Office results were sent out, they were referred to as "draft" results pending feedback on Working Paper 14. The Committee feels that the feedback was sufficiently positive that the results can now be confirmed as "final".

4.2 The CMI is also now making available to member offices the 1999-2002 data in raw format to allow interested parties to perform their own analyses. The data basically comprises the raw data received from offices so, for example, does not include estimated dates of diagnosis. Office number and product code have been removed to preserve the confidentiality of offices. More details are available via the CMI's pages of the Profession's website.

4.3 The Committee intends to publish its analysis of the 1999-2002 experience in a CMI Report in 2006. Before doing so, we intend undertaking further work in the following areas:

   a) Grossing-up factors. As noted in 2.9 work has commenced to try and derive grossing-up factors that apply to subsets of the data.
   b) Age-specific rates. Results released to members were in broad age groups whereas we believe actuaries would appreciate an indication of the individual-age rates.
   c) Adjustments to CIBT93. This was discussed in 3.10.4 as an alternative to a full graduation of the 1999-2002 quadrennial data.
   d) Experience by Product group. Supporting information has not yet been received from all offices, so no analysis has yet been undertaken into the experience under the different types of contract within which critical illness is included (e.g. Whole Life, Endowment, Term). Care will be required to ensure we are not simply duplicating differences between offices or between sales channels. There is also the probability that different grossing-up factors may be required.

4.4 The Committee would welcome input on other areas than can usefully be investigated given current data volumes.

5. PROPOSED TREATMENT OF CLAIM DELAYS IN DATA ANALYSIS IN FUTURE YEARS

5.1. Good progress is being made on the collection of data for 2003, although the CMI is still at the stage of checking data submissions and resolving queries. This should be complete soon in respect of those offices who contributed data included within the quadrennial results.

5.2. A number of new offices have submitted - or are expected to submit – data from 2003. Inevitably, it can take longer to validate the first data submission from an office and the Committee intends releasing the 2003 results for the 'existing' group of offices, rather than delaying for an unknown period whilst the remaining data is collected and validated. This will also facilitate comparison of the 2003 results with 1999-2002. The Committee hopes to be able to release updated 2003 results at a later date including all the 'new entrants', but this is obviously dependent on being able to preserve confidentiality for all offices.

5.3. The normal process by which results are issued can be summarised as follows:
   a) Offices submit data
   b) CMI Secretariat checks the data
   c) CMI issues error report and warning report on the data
   d) Office confirms data is correct
   e) CMI processes data and generates results for that office which are sent back to the office

f) Once all the expected offices have submitted verified data, 'all office' results are generated and sent to all CMI members.

5.4. The Committee is conscious that claim delay patterns may change from those present in the 1999-2002 dataset, perhaps because of changes in claim settlement processes or a changing mix of cause of claim or indeed the inclusion of new offices. It is theoretically correct to use the observed claim delay patterns underlying the 2003 data to estimate the missing dates of diagnosis (where offices are unable to supply these) and to estimate the grossing-up factor. However to use the 2003 claim delay pattern would necessitate waiting till all data had been collected and analysed before any 2003 results could be released to offices. As well as introducing delays, if analysis of their results causes an office to re-submit its data, the CMI might find it needs to re-work and re-issue all individual office results because of the issues affecting the one office.

5.5. The Committee is considering 2 approaches to resolve this:
   a) Use the delay adjustments inherent in the 1999-2002 data throughout the forthcoming quadrennium.
   b) Use the delay adjustments inherent in the preceding 4 years for the following year's results.
   For 2003 results there is, of course, no difference between these approaches. However for 2004, method a) would mean that claims delays from 1999-2002 are used whereas method b) means that 2000-2003 claims delays are used.

5.6. Both of these approaches carry the benefit that because the claim delays are already known, there is no delay in issuing individual office results. These can be issued to the first office as soon as its data has been verified, without waiting for other, slower offices.

5.7. A further benefit of method a) is that the results are directly comparable with the results of preceding years, rather than being a function of changed assumptions. Against this, each year's results will be using an increasingly out-of-date set of delay assumptions. Given that there is no difference on 2003 results, the Committee will wait to see whether the delay patterns have altered before deciding how to proceed in future years.

5.8. Once the 2003 data has been collected for all offices, analysis of the delay patterns will be undertaken and released. This will allow offices to understand the approximate effect of having used the 1999-2002 claim delay pattern rather than that underlying the 2003 data.

5.9. Analysis of the 2003 data will also allow the Committee to decide whether to alter the assumptions to be used in 2004. It is likely that if the claim delay patterns alter significantly, then approach b) will be used. However if they only alter slightly then the benefits of a common comparison basis will prevail and approach a) will be used. This process will be adopted for results for 2005 and 2006 and the 2003-6 quadrennium. Results for the quadrennium will then also be re-stated using an updated delay pattern.

5.10. This process will be kept under review. If it is necessary to use different assumptions on delay patterns then the Committee will try to release results on "old" and "new" bases to show the impact of the change.

Appendix A: Feedback received on WP14

Ref	Comment	Response
1	I would appreciate a more detailed analysis of grossing up factors, for example varying by: * duration - to allow more accurate estimation of any select effect. This would be a key factor. * age * sex and smoker status * cause of claim For example an analysis along the lines of the Society of Actuaries in Ireland paper of 3 November 2003 would be useful, where adjustment factors are given in Appendix 2 varying by many different factors. Even if these were based on estimated date of diagnosis, this may be preferable to the approach of only quoting a single grossing-up factor.	The request for more grossing-up factors is considered in Section 2.3 of this paper.
2	I would welcome the production of results in spreadsheet format as well as the PDF report.	Unfortunately the current systems generate results in a pre-determined format in Word. It is obviously possible, though inconvenient, for these to be extracted into Excel. Consideration will be given to how results can be made available in a more flexible format.

Ref	Comment	Response
3	In 4.1 and 5.1.6, it would be good to know what volumes of data were excluded for which reasons.	We do not have access to a summary of this and are unsure of the value to be obtained from potentially a significant of effort that would be needed to re-visit each data submission from each office.

The primary purpose of the data checks described in 4.1 is to alert offices to possible issues. This often leads to data re-submissions, whereupon the data checks are re-run. The CMI would not however seek to examine how much data was excluded via this process.

In 5.1.6, claims were only excluded as a result of issue (i). The Coding Guide for the CI investigation asks for such claims to be excluded, so knowing the number of such claims is of limited value, as we would not know how many such claims were excluded by the offices themselves prior to data submission. |
| 4 | In 5.2, is the average delay the right measure? When analysing late-reported annuitant deaths, I find that the mean delay is 35 days, but the median delay is only 14. The mean risks being unduly influenced by extremely long delays. | The Committee knows that using the mean is an approximation to adjusting by a distribution of delays. We felt that it is a reasonable approximation given the considerable complexity that would have resulted from using a distribution, although we accept that it is influenced by very long delays. In any case, the revised methodology described in section 6.5 of Working Paper 14 reduces the dependence on this. |
| 5 | In 5.3.3 I would have thought that some sort of censored model would have been possible, especially with per-policy data. Indeed, 5.5.9, 6.2.2 and 6.2.3 all surprised me: 5.5.9 states that the analysis methodology is "data-hungry", whereas I would have thought that individual per-policy data meant that the kind of summarised cell data in 6.2.4 was unnecessary. With per-policy individual data, surely some kind of GLM is possible? | The Committee is not clear how a censored model would improve matters. A key issue with the data are the fault lines described in section 5.5.4 of Working Paper 14 which makes it difficult to apply GLM models or other approaches that we were aware of. |

Ref	Comment	Response
6	Was there any attempt to account for over-dispersion? I don't know if there is a tendency for people to have multiple CI policies, but this is very common for annuities and endowments.	No attempt was made to allow for over-dispersion. Clearly people may have multiple Critical Illness policies, and these could give rise to correlated claims. We believe, however, that this is more of an issue for any graduation than for the work undertaken to date.
7	In 7.7, we find that there is a significant difference in reporting delays (for annuities) between men and women, between single-life and joint-life cases, and a particularly large difference between lives and amounts. We found that late-reported deaths were a much bigger phenomenon for lives, and that amounts-based measures were much less affected. If the same applies to CI business, amounts-based A/E figures might require less grossing up.	The need for more grossing-up factors is considered in Section 2.3 of this paper. Deriving grossing-up factors based on amounts, rather than lives, is a particular example of this

Ref	Comment	Response
8	*Section 5.4 Observed Claim delay patterns* Looking at the table provided in section 5.4.2 it seems that there may indeed be a change in emerging delay patterns (as intimated by the authors). The diagonals representing notifications from the same calendar year of exposure for the quadrennium runs as follows: | Exposure	Claim Reported			
---	---	---	---	---
Calendar Year	Same yr	Calendar yr +1	Calendar yr +2	Calendar yr +3
1999	356	108	11	4
2000	736	319	45	23
2001	1091	429	55	27

2002	1481	560	65	22 |
				
				Assuming that claim incidence and exposure lapse approximately offset each other, one might expect that the relationship of observed claim pattern should reflect that observed for "Same yr" notifications, but out of phase by one year ("fault" and changes in contributory offices aside). Hence 736:356 would suggest expectation that
				    319 becomes 736/356*319 (cf 429), and
				    55 become 736/356*55. (cf 65)
				Clearly this is a crude approach, but the observation that numbers reported are actually lower may imply that claim delays are shortening. This is not to suggest that there will not still be delays in claim processing. A shortening of delay patterns may be anticipated with a broadening claim awareness among policyholders.
				
				Clearly the derivation of a claim delay pattern is sensitive to underlying data and assumptions, and this sensitivity can magnify the effect (e.g. 5% or 10% outstanding) as the cumulative curve approaches 100%.
					The need for more grossing-up factors is considered in Section 2.3 of this paper. Deriving grossing-up factors by calendar year is a particular example of this.
					
					The Committee believes the approach used in this comment is too crude and overlooks the fault lines which exist in the data, described in section 5.5.4 of WP14.

9	*Section 6.2.4* Is the square bracket in the wrong place? Shouldn't the claims be given a full year of exposure in the year of claim?	The Committee believes the bracket is in the correct place for calculating an initial rate, as the other half-year of exposure for claims will on average be contributed from the start on force. The Committee accepts that there may be an issue here if a substantial number of claims occur at duration 0, where no exposure is attributed from the start in force.

Ref	Comment	Response
10	*Section 7 Grossing-up Factors* This is a trite point, but for offices who are conducting their own investigation and allocating claims back to the year of actual diagnosis (as opposed to year of settlement), the grossing up factor would be less than that suggested by the table in Section 7. Presumably the only grossing up required would be that which is required to reflect the office's view of residual delay from their own "chain ladder" type experience analysis.	Offices using actual date of diagnosis will be allocating claims out of the investigation period. If they are undertaking their analysis some time after the investigation period then they will also be able to allocate claims into the period, which should result in lower grossing-up factors. If it is done soon after, though, the grossing-up factors are likely to be higher as they will require a gross uplift (i.e. prior claims have been removed, so the uplift is adding an estimate of all outstanding claims) rather than the net uplift we have estimated (i.e. prior claims have been retained in the analysis, so we are estimating the net effect of adding claims over removing claims)
11	section 7. Given the importance of the grossing-up factor, is it possible to incorporate this factor in the experience published, at least for the data carve ups of the 1999-2002 All Office experience ? If this could be done, it would make the results less liable to be misunderstood and would remove the first 3 reservations on page 21,and therefore provide 'reliable' duration, age, sex, smoker status distinct results.(Could this also be extended to distribution channel ?) Without this, is anything gained by publishing more than the total aggregate A/E, as this is the only result the committee has given guidance on how to adjust to get meaningful results.	The need for more grossing-up factors is considered in Section 2.3 of this paper.
12	section 7. From what [X] said in his comments [see 7 above], it seems that different adjustments may be needed for amounts data. Is it feasible to provide these? Without it, what is the benefit of publishing amounts experience?	See the response to point 7.

Ref	Comment	Response
13	section 7. Is it possible for offices to adjust their own results to get age-specific (or any of the other data carve ups) grossing-up factors ? It was not clear to me exactly what was meant in 7.5 by a 'consistent portfolio of business', so maybe some further explanation would be useful.	Offices that maintain complete records of dates of diagnosis may actually now be in a position to consider their experience at a later stage of development (by looking at claims settled in 2003 and 2004 but diagnosed in 2002 and prior, and removing claims diagnosed prior to 1999 from their analysis) and so will have much lower grossing-up factors. Offices without such data are reliant on assuming their experience mirrors the all office grossing-up factors. By consistent, we meant the same underlying block of business (e.g. not comparing endowments and term assurances in year x+1 with just term assurances in year x).
14	A minor point on Figure A2.The title of the chart and key to the lighter coloured bar are not consistent-presumably both should be 'refined date of diagnosis method'.	Agreed
15	The information around claim delay by policy duration at date of settlement/notification/admission will obviously be useful to know, but presents modelling problems as the users of the CMI data do not know this policy duration. We are constantly working backwards from the adjusted data presented to try and model the underlying scenario. Without making the underlying claims data available (is this possible - suitably anonymised of course?) it is hard to see how to get round this.	The Committee are investigating what data can be made available without risking confidentiality. Feedback from members on what data would be useful to tehm would be helpful in this regard.
16	The model produced by myself for the 1998-99-2000 data suggested that the growth rate of exposure at the 5+ duration was considerably higher than duration zero for example. This led to the IBNS adjustment varying by duration quite markedly for the reasons described in your paper and once applied the results (including IBNS) showed a reasonable positive selection pattern that was not apparent from the data presented by the CMI at that time. Two comments follow 1. I have not done the work for the full quadrennium so I'm not sure the results will be so marked this time 2. I challenge the single figure of 15% in paragraph 7.6. I think this will underestimate ultimate experience and lead to underpricing.	Interpretation of growth in exposure is made difficult by the entry of new offices / portfolios into the investigation. The need to consider grossing-up factors by duration is another request for more grossing-up factors, considered in Section 2.3 of this paper. The Committee is highly aware of the need for careful use of its results to avoid under-pricing and under-reserving and underlines why the Committee is nervous of producing a graduated table at this time.

Ref	Comment	Response
17	Can I just confirm with you that the data underlying the 'all causes' curve [Figure 4 (observed and underlying claim settlement delay patterns)] relates to all claims **including** deaths, rather than CI claims only?	WP14 is certainly not clear, for which the Committee apologises. The graph is based on Critical Illness claims only, i.e. does not include deaths. Confusingly, paragraph 5.5.8 of WP14 (which refers to Figure 4) then quotes average delays which are based on all claims (i.e. including deaths).
18	It is far better to estimate independent rates, rather than dependent. If you use dependent rates, you strictly can't validly compare the results from Stand Alone and Accelerated, nor can an office that e.g. excludes TPD compare its results with anything. But to get independent rates is easy. Calculate "central exposures", rather than initial, i.e. don't add back half the events in the formula in 6.2.4, and then use k_mu_x (or perhaps x+1/2) in 6.3.2. Mu's are the same whether independent or dependent, and from them one can estimate dependent q's for whatever set of causes one wishes to include. Further, if you are using a formula for graduation, it is much better to estimate mu's than q's. The Mortality and IP Committees have been doing this for years.	This was debated within the Committee and the predominant view was that the margin for error in our work totally overshadowed the difference between a mu and a q. In addition we believe that the base table (CIBT93), against which we are providing comparisons, is based on q-type rates. The Committee will re-visit this topic in the future.
19	In 6.4.2(ii) it is noted that cause of claim has not been taken into account. I can see good reasons for not analysing by office, but the number of major causes is not large (10 analysis groups in Appendix C plus Death), and you are treating Death separately anyway. I would have thought it worth looking at the delays by major cause and using that in the adjustments.	The Committee's view was that whilst there were significant differences between death claims and critical illness claims (delays being shorter for deaths), differences between the various Critical illnesses were less significant. For example delays between diagnosis and settlement for cancer and heart attack – the two biggest causes of claim – are very similar. Use of more adjustments would have meant a loss of credibility and complicated the analysis. The Committee will consider this further as data volumes develop.

Ref	Comment	Response
20	**Section 5.2**: It would be good to give a fuller description in the paper of what claims have had such long notification delays, and whether the delays are due to the nature of the diseases themselves or due to administrative errors etc. This will help companies when doing experience analysis and product design.	The CMI does not receive any qualitative information on why delays occurred. Analysis of the 32 claims where the delay between diagnosis and settlement exceeded 5 years indicates a mix of claim events (18 Cancer, 6 TPD, 5 Heart Attack and 3 MS). These claims are spread between 4 offices, which may appear low but they are large offices who were writing business in the mid 1990s (when the policies resulting in these claims were written). The average sum claimed under these policies appears lower than average (but the policies are older). 2 of the claims appear to be on the same life, although under different types of policy (with the same office). Of the 32 claims, for 17 we have also been provided with a Date of Notification. In all cases, the delay is primarily in notification, not between notification and settlement. One of these claims had a period between notification and settlement of just over a year, all the rest had corresponding periods of 1-3 months.
21	**Paragraph 6.6.1:** You say here that "The estimated dates of diagnosis do not therefore provide a strong foundation for removing claims from the investigation." However, the settlement pattern is later used in Section 7 to do exactly this. For clarity, perhaps you should perhaps refer to just individual claims here.	We disagree with this comment. Use of estimated dates of diagnosis to remove claims would have placed undue reliance on the mean delay (see comment 4 above). It would also have produced a single answer which the Committee was keen to avoid. The grossing-up factors in section 7 are estimates of the net effect of removing and adding claims, but they are only estimates.
22	**Section 7 -** Grossing up factors: We would find it useful if here you separated out the claims referring to prior years and the estimates for IBNS going forward for each of the rate of growth assumptions, and for the overall impact on the 1999-2002 experience. Also, some sensitivities on the speed of the settlement pattern might be useful here.	The Committee will consider what further analysis it can undertake here alongside the additional work on grossing-up factors.

Ref	Comment	Response
23	We believe that a lesson that the industry should learn from this exercise is that offices need to invest more time and effort into providing the CMI with the data it needs for its analyses. One way to do this would be to involve reinsurers in the process to a greater extent than they are currently. There is a lot of technical expertise within reinsurers, and a lot of data as well, which the CMI is not tapping into at the moment. We would welcome meeting up with you to discuss some ideas that we have surrounding this.	Unsurprisingly, the Committee fully endorses the first comment! We would point out, however, that the importance of using data of diagnosis was not fully recognised at the start of the 1999-2002 quadrennium and offices cannot be blamed for not being able to provide something they weren't being asked for! We found the second comment surprising, given that the Committee is populated almost completely by actuaries who are or have worked in reinsurance! We also have regular dialogue and input from a number of other reinsurers. Further input is always welcome and we will respond independently to the suggestion of a meeting.
24	One suggestion we have is to provide a credibility check on the answers CMI obtain. If one has a block of business duration x, then by grossing up for lapses one can estimate past exposures x-1, x-2 etc that contribute to that block of claims by settlement date. Since the estimation of such exposures is independent of claims delay the results (after adjusting for claims settled rather than claims diagnosis rates) that are different may point to a problem.	The Committee are unsure of the benefits of such an approach, given the changes in portfolios that we have within the quadrennium and the fact that we are working with census data. As a result lapse rates will be difficult to estimate and - in the event of a discrepancy between the approaches - it will not be apparent where the issue lies.

Ref	Comment	Response
25	We have compared the latest 1999 and 2000 results, with those released during 2003 for those investigation years. We are aware that the 99-02 CMI release uses a different methodology to calculate date of diagnosis and that certain offices revised their claims data from that which was available in the original 2003 releases. However, it is not made clear in WP14 that considerable changes in the exposure and business mix also occurred between the two data releases, significantly impacting the Exposures, Actual Claims, Expected Claims and A/E ratios. Can you explain what, apart from claims methodology, changed in respect of investigation years 1999 and 2000, between the 2003 release and the latest 1999-2002 release?	We apologise for not making the extent of the changes clear. With hindsight we have perhaps been over-conscious of protecting individual office confidentiality. The latest release of results is indeed based on a markedly different dataset to those released in 2003. As well as revisions to claims and exposure data, there are a number of offices who have joined the investigation since those results were released. In addition two offices whose data was included in the 1999 and 2000 results was not included within the quad because of data integrity issues that only emerged with their 2001 submissions. The Committee therefore recommends that the earlier releases of 1999 and 2000 results are ignored. It is normal CMI practice for such data to be included within the quad analysis, even though it was not contained in the individual years.